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MOUNT WILSON OBSERVATORY

PASADENA, CALIFORNIA

LIST OF LANTERN SLIDES AND PHOTOGRAPHS

1932

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LIST OF SLIDES AND PHOTOGRAPHS

SERIES A. INSTRUMENTS AND BUILDINGS

A 2 Snow telescope building from the southeast

3 Snow coelostat and second mirror from the southeast

4 Snow coelostat and second mirror from inside the rolling shelter

5 Interior of the Snow telescope showing concave mirror

6 Five-foot spectroheliograph showing the slit end

7 Five-foot spectroheliograph showing the optical train

10 Sixty-foot tower telescope from the northeast

16 Interior of the physical laboratory in Pasadena

17 Diagram of the one-hundred-fifty-foot tower telescope

18 Diagram of the upper end of the one-hundred-fifty-foot tower telescope and dome

20 Sixty-foot dome from the east

21 Sixty-foot dome from the sixty-foot tower

22 Sixty-inch reflecting telescope from the west

25 Sixty-inch reflecting telescope showing plate-holder attachment

26 Sixty-inch mirror on grinding machine tipped forward for testing

27 Sixty-inch reflecting telescope with Cassegrain spectrograph

*28 Dome of the one-hundred-inch Hooker reflector from the south showing shutter open

29 One-hundred-fifty-foot tower telescope from the sixty-foot tower telescope

*30 One-hundred-fifty-foot tower telescope from the northeast

31 Top of the seventy-five-foot spectrograph

32 One-hundred-foot dome from the one-hundred-fifty-foot tower

33 Model of top of Mt. Wilson showing buildings of the Observatory

34 View from the balcony of the Hooker telescope dome showing the sixty-inch telescope dome, the sixty-foot tower telescope and the one-hundred-fifty-foot tower telescope

35† Site for the telescope. Concrete footings for the building being put in. Photographed from the one-hundred-fifty-foot tower telescope

36 Pier for the telescope under construction. Photographed from the one-hundred-fifty-foot tower telescope.

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† Nos. 35 to 76 and 79 all pertain to the one-hundred-inch Hooker telescope.

A 37 Pier for the telescope under construction. Forms for the floor and supporting brackets in place

38 Putting in the reinforcing rods for the concrete floor of the pier

39 Pier and a few columns for the building as seen from the southwest

40 Same as A 39, except as seen from the northeast. Also showing the one-hundred-fifty-foot tower telescope in the distance

41 Surfacing the rails for the dome by means of a motor-driven grinder, pushed along by a motor-driven truck and guided by a steel boom pivoted in the center

42 Erection of the building. Inner sheathing on lower part in place. Lower part of dome framework up

43 Detail view of rails, trucks, and framework of balcony of dome

44 Top section of main girder of the dome ready for hoisting

45 Top section of main girder being hoisted into place

46 Framework of the dome completed and inner sheathing begun

47 Putting on the inner sheathing, brackets and ribs for the outer sheathing

48 Near view of the building and dome completed, except the outer balcony, showing the shutter wide open

49 Dome completed, showing the fin used to balance the wind pressure on the shutter

50 Drawing of a section of the building and dome, the pier, and the telescope as seen from the west

51 North pedestal of the telescope, also showing the ten-ton crane used in the erection

52 West member of the fork for the telescope being swung into place

53 Lower section of the telescope tube placed in the fork

54 Second section of the tube in place, and third section ready to be hoisted

55 Driving clock of the telescope, set up in the shop for testing

56 Drawing showing the driving clock, worm wheel, south spherical bearing, mercury trough and steel float, also quick-motion drive in right ascension

57 Cutting the teeth in the worm wheel

58 Driving clock, worm and part of the worm wheel

59 Mirror on the grinding machine ready for concaving the surface

60 Mirror on the grinding machine, with concave surface polished and ready for parabolizing, showing the full-sized polishing tool and the band for supporting the mirror when the turn-table was tipped forward for testing

A 61 Mirror silvered and tipped forward on turn-table for testing

62 Bottom of the cell with lever system and plates for supporting the mirror, also showing piping for temperature control

63 Lowering the mirror on to the support system

64 Lowering the ring of the cell over the mirror

65 Mirror in its cell in the silvering room under the main floor of the pier, showing the silvering band and spout in position

66 Mirror in its cell being raised above the pier floor after having been resilvered

67 Mirror in its cell back in the lower end of the tube ready to be bolted tight

68 Fork of the elevator descending after the cell has been bolted to the telescope

69 Switchboard for the dome drive, showing faces of the motor-driven rheostats and automatic switches

70 Drawing, showing assembly of the declination bearings, tube, mirror in its cell, and coils of pipes for temperature control

71 Drawing, showing assembly of the coudé and Cassegrain convex mirror mountings and cages

72 Drawing, showing assembly of the Newtonian flat mirror mounting and cage

*73 Interior of the dome, showing the telescope, Cassegrain observing platform, etc., as seen from the west

74 Cassegrain spectograph attached to the telescope; Cassegrain platform

75 Twenty-foot interferometer beam on the tube, showing mirrors 12 feet apart

76 Diagram of light path when the interferometer is used

77 Pasadena offices, laboratory and shop

78 Thermocouple used for stellar and planetary radiation

79 View of observer at Cassegrain focus of one-hundred-inch telescope

80 Hale Solar Laboratory in Pasadena

81 Top of large spectrohelioscope at Hale Laboratory

82 Drawing of optical parts of spectrohelioscope as adapted to general use

83§ Airplane view of Observatory from the southeast

84 Airplane view of Observatory from the south

85 Airplane view of Observatory from the southwest

§ Nos. 83 to 87 are available through the courtesy of E. R. Hoge, Fairchild Aerial Surveys, Los Angeles

A 86 Airplane view of Observatory from the northwest

87 Airplane view of Pasadena and Mount Wilson from the southwest

88 Fifty-foot interferometer from the south

89 Fifty-foot interferometer from the north showing shelter

90 Fifty-foot interferometer from the north

91 Fifty-foot interferometer, showing lower section

SERIES B. SOLAR PHENOMENA

B 2 Comparison photographs of the sun, taken with the calcium H_2 line and direct image, July 30, 1906

3 Comparison photographs of part of the sun, taken with the hydrogen Hδ and the iron line λ 4045.9, November 13, 1907

4 Part of the sun photographed with the hydrogen Hα line, April 30, 1908

5 Part of the sun photographed with the calcium H_2 line, April 30, 1908

6 Part of the sun, direct photograph, April 30, 1908

*7 The sun photographed with the Hα line, October 7, 1908

8 Series of four photographs taken with the hydrogen Hα line, showing the motions of a very dark hydrogen flocculus near a spot, June 2 and 3, 1908

9 Part of the sun photographed with the hydrogen Hα line, showing right- and left-handed unipolar vortices, September 9, 1908

10 Part of the sun photographed with the hydrogen Hα line, showing a multipolar group of spots with fine stream lines, September 2, 1908

11 Same as No. 9, except photographed October 7, 1908

12 Series of twelve photographs of an eruptive prominence projected on the sun's disk, made with the Hα line, September 10, 1908

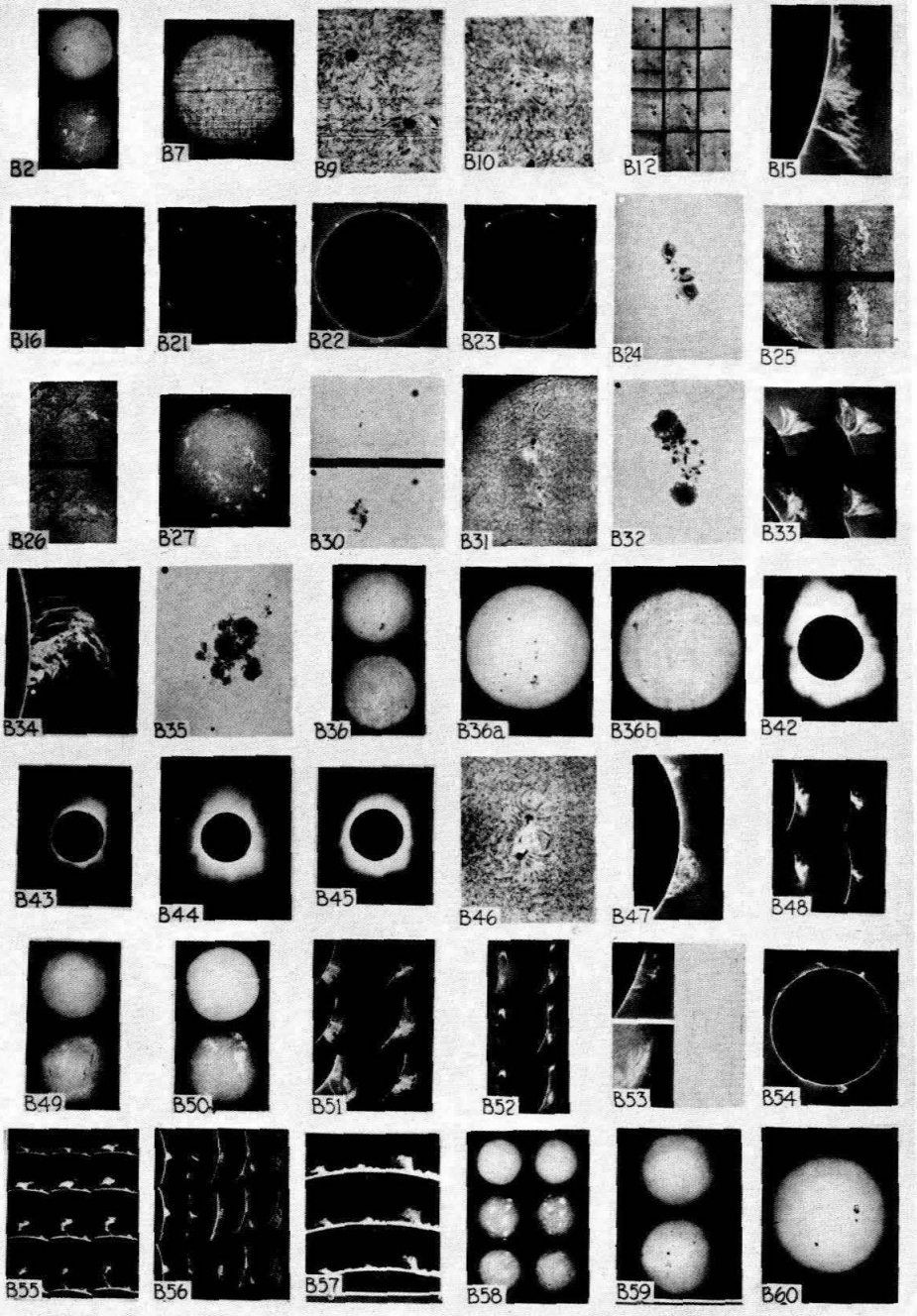
13 Series of four photographs of a spot group taken with the Hα line, showing motions of the flocculi, August 29, 1908

14 Series of four photographs of two spots, north and south of the equator, taken with the Hα line, October 4, 1908

*15 Prominence 80,000 miles high, photographed with the Hα line, August 21, 1909

16 Chromosphere and prominences photographed with the Hα line, August 20, 1909

*17 Photograph of spot group taken with the Hα line, showing bipolar type of solar vortices, September 10, 1909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B 18 Chromosphere and prominences photographed with the hydrogen Hα line, August 25, 1909

20 Series of four photographs of a prominence taken with the hydrogen Hα line, October 10, 1910

21 Chromosphere and prominences photographed with the hydrogen Hα line, September 20, 1909

22 Chromosphere and prominences photographed with the hydrogen Hα line, September 21, 1909

23 Chromosphere and prominences photographed with the hydrogen Hα line, September 22, 1909

24 Large sun-spot group, June 17, 1907

*25 Series of four photographs of the southwest quarter of the sun, taken with the hydrogen Hα line on August 3, 5, 7 and 9, 1915

26 Part of the sun, photographed with the hydrogen Hα line, September 9, 1915. Two exposures showing large prominence (dark) on the disk

27 Combined photograph of the sun and prominences of May 22, 1916, taken with the K line of calcium

28 Two views of the prominence of May 22, 1916, photographed with the hydrogen Hα line; one showing prominence at limb; the other, projected on disk and running off, over and beyond limb

29 Five exposures on a portion of the sun taken with the Hα line, showing the appearance at different levels, May 29, 1916. Slit moved from center of line 0.33 A towards red between exposures

30 Remarkable twenty-four-hour development of sun-spot group, August 18 and 19, 1916

31 Northwest quarter of the sun photographed with the hydrogen Hα line showing a large spot group with beautiful stream lines, January 5, 1917

*32 The great sun-spot group of February 8, 1917

33 Large quiescent prominence, 110,000 miles high. Four views photographed with the Hα line, June 10, 1917

*34 Large active prominence, 140,000 miles high, photographed with the K line of calcium, July 9, 1917

35 The great sun-spot group of August 8, 1917

36 Comparison photographs of the sun, taken with the hydrogen Hα line, and direct image, August 12, 1917

*36a Photograph of sun showing direct image only, August 12, 1917

*36b Photograph of sun showing Hα image only, August 12, 1917

B 37 Series of exposures on four consecutive mornings, showing the western part of the sun, illustrating the way in which the (dark) prominences on the disk are carried over the limb by rotation. Photographed with the Hα line; June 27, 28, 29, 30, 1917

42 Solar corona photographed at Green River, Wyoming, June 8, 1918, exposure 65 sec. through clouds

43 Solar corona photographed at Middletown, Connecticut, exposure 2 sec., January 24, 1925

44 Solar corona photographed at Middletown, Connecticut, exposure 15 sec., January 24, 1925

45 Solar corona photographed through red filter at Middletown, Connecticut, exposure 73 sec., January 24, 1925

46 Large bi-polar spot group photographed with the hydrogen line Hα, showing stream lines, August 30, 1924

47 Large prominence, July 9, 1926

48 Comparison of prominence in hydrogen Hα and calcium K light, March 10, 1926

49 Comparison photographs of the sun, taken with the hydrogen Hα line, and direct image, June 16, 1926

50 Comparison photographs of the sun, taken with the calcium K line, and direct image, January 11, 1926

51 Prominence of March 21, 1928, six exposures

52 Prominences of May 4 and 5, 1928, six exposures

53 Prominences of August 19, 20, 1927. Exposures at limb and disk with curve of magnetic variations on May 12, 1927 and August 20, 1927

54 Prominences. Whole sun taken with calcium K line, December 9, 1929

55 Prominence series. Twelve exposures, June 18, 1929

56 Classification of solar prominences. Three views each of five types of prominences

57 Prominences of August 6, 1931. Comparison Hα and K. Three exposures

58 Comparison of direct, K_2, and Hα images of the sun, October 10 and 14, 1926. Six exposures

59 Comparison of direct photographs of whole sun at maximum and minimum spot activity. June 22, 1931 (min.), no spots; November 30, 1929 (max.), many spots

60 Direct photograph of whole sun showing the largest group ever photographed, January 24, 1926

B 61 Large spot group photographed with the hydrogen Hα line, August 14, 1929

62 Large spot group photographed with the hydrogen Hα line, May 12, 1931

63 Curve of sun-spot activity showing the frequency of sun-spots from 1750-1930

64 Curve of a single sun-spot cycle with four calcium spectroheliograms showing typical appearance of sun at different phases of the cycle

SERIES C. SOLAR SPECTRA

C 5 Comparison of titanium oxide fluting in sun-spot and electric furnace λ 7100

6 Iron triplet λ 6302.7 in spectrum of spot near sun's limb, with nicol and compound half-wave plate, showing plane polarization across lines of force

7 Iron triplet λ 6302.7 in spectrum of spot near center of sun, with nicol and compound quarter-wave plate, showing circular polarization along lines of force

8 Iron triplet λ 6173 in spectrum of sun-spot, March 9, 1916, showing right- and left-handed circular polarization by transmission of red and violet components of the line on same strip of quarter-wave mica, thus demonstrating the presence of two overlapping fields of opposite sign. Slit placed as shown on photograph of spot

9 Iron triplet λ 6173 in spectra of sun-spots, *a* and *b*, plane polarized light of spot near sun's limb, taken with nicol and (*a*, single; *b*, compound) half-wave plate; *c* and *d*, circularly polarized light of spot near center of sun, taken with nicol and (*c*, single; *d*, compound) quarter-wave plate; *c* shows reversal of sign of charge of adjacent spots

10 Iron triplet λ 6302.7, showing different strengths of field in two sun-spots

11 Iron triplet λ 6173 in spectrum of sun-spot near limb, showing plane polarization compared with laboratory spectra of iron lines. Taken with nicol and half-wave plate

12 Iron triplet λ 6173 in spectrum of S. preceding spot of the great group of August 8, 1917, showing reversal of circularly polarized light. Taken with nicol and (*a*, single; *b*, compound) quarter-wave plate

13 Spectrum of sun-spot showing the lines λλ 6145.2 and 6145.5 weakened in the spot spectrum. Taken with nicol and compound quarter-wave plate

14 Spectrum of the "flash" (lower chromosphere) showing magnesium lines, green carbon fluting, etc.

C 15 Spectra of opposite points on the sun's limb, latitude 0° to 90°, showing displacements of lines due to solar rotation

16-26 Sun spot spectrum map. Five strips on each photograph. Scale of 8x10 prints is 3.7 mm per A

C 16	Region λλ 3900—4150	C 22	Region λλ 5400—5650
17	" 4150—4400	23	" 5650—5900
18	" 4400—4650	24	" 5900—6150
19	" 4650—4900	25	" 6150—6400
20	" 4900—5150	26	" 6350—6600
21	" 5150—5400		

27 Spectrum of the "flash" at second and third contacts, and spectrum of the corona, taken at Middletown, Connecticut, January 24, 1925

28 Spectrum of the sun λλ 3900-6900 taken with 13-foot spectograph

29-38 Sun-Fe arc spectrum map. Scale, Nos. 29 to 36, 2 mm per A; Nos. 37-38, 1 mm per A

C 29	Region λλ 3000—3300	C 34	Region λλ 4500—4800
30	" 3300—3600	35	" 4800—5100
31	" 3600—3900	36	" 5100—5400
32	" 3900—4200	37	" 5400—6000
33	" 4200—4500	38	" 6000—6600

SERIES D. STELLAR SPECTRA

D 2 Spectrum of the Wolf-Rayet star B.D.+30°3639 having an atmosphere of hydrogen, showing the hydrogen series from Hβ to Hζ, made with the focal plane spectrograph

3 Spectrum of α *Tauri* λ 4320 to λ 4430, iron comparison, made with the Cassegrain spectrograph

4 Types of stellar spectra. Nine types from B to N

5 Absolute magnitude effect: 61 *Cygni* and β *Ursae Minoris*

7 Spectra of stars of high and low radial velocity: Lal. 1966, velocity —325 km/sec., and a second star, —10 km/sec.

8 Spectrum of a spectroscopic binary, showing shifts of lines toward V and R on two exposures

9 Spectrum of the star cluster Messier 13, *Hercules*

10 Spectrum of the central part of the nebula in *Andromeda*

11 Spectrum of the spiral nebula N.G.C. 4595

12 Spectrum of the nebula in *Orion*

13 Spectra of Wolf-Rayet stars B.D.−21°4864 and +35°4013. These are extreme types of these stars

D 14 Spectrum of the star Boss 5650, showing peculiar character of Hβ and Hγ

15 Spectrum of the Cepheid variable star TU *Cassiopeiae* at maximum, October 7, 1917, and at minimum, September 30, 1917

16 Spectrum of the Cepheid variable star RT *Aurigae* at maximum and minimum

17 Spectra of the N-type stars 19 *Piscium*, B.D.+25°205, +57°702 and +38°1539. Blue region

18 Spectra of *Omicron Ceti (Mira)*, October 5 and November 23, 1917, January 23, 1918, and January 18, 1919

19 Spectrum of *Omicron Ceti (Mira)*, large scale, November 1, 1917

20 Spectrum of λ *Cygni*, showing enhanced lines
Spectrum of λ *Aurigae*, showing normal lines

21 Seven stars having unusual spectra, B.D.+23°123, o *Ceti*, R *Aquarii*, B.D.+11°4673, T *Tauri*, Nova *Aquilae*, Nova *Ophiuchi*

22 Spectrum of *Omicron Ceti*, taken 9, 53, 87, 130, 144, 174 and 188 days after maximum

23 Typical spectra of giant stars of types F to M

24 Typical spectra of dwarf stars of types F to M

25 Spectrum of the companion to Sirius, λλ 4400-4900

26 Prismatic coudé spectra

Region λλ 4308-4481, 1.1 A per mm, α *Lyrae*, α *Cygni*, α *Persei*, sun, α *Boötis*, α *Tauri*, α *Orionis*

Region λλ 4737-4960, 1.7 A per mm, α *Persei*, α *Boötis*, α *Tauri*, α *Orionis*

Region λλ 5880-6575, 5 A per mm, α *Lyrae*, α *Tauri*, α *Orionis*

27 Widened prismatic coudé spectra of stars of different spectral types

Region λλ 4300-4600, 1.4 A per mm, α *Canis Majoris*, α *Cygni*, α *Canis Minoris*, α *Persei*, Sun, α *Boötis*, α *Tauri*, α *Orionis*

28 Spectra of M-, N-, and S-type stars

Region λλ 4000-5000, R *Boötis*, R *Cassiopeiae*, R *Geminorum*, R *Andromedae*, 19 *Piscium*, TT *Cygni*

29 Ultra-violet spectra of α *Lyrae*, α *Cygni*, γ *Cygni*, and α *Boötis*. Region λλ 3600-4150

30 Widened low-dispersion spectra with direct photographs of distant extra-galactic nebulae showing large red shift

N.G.C. 385,	3,000 mlies per second
N.G.C. 4884,	4,200 miles per second
Ursa Major Nebula,	7,300 miles per second
Leo Nebula,	12,000 miles per second

31 Coudé spectrum of 61 *Cygni*. Regions λλ 4380-4960 and 5160-6600

D 32 Spectra of *Mizar* showing single and double lines

33 Enlarged spectra of four early-type stars showing different forms of emission of Hα: c *Persei,* H.D. 50138, H.D. 142983, P *Cygni*

34 Display of stellar spectra taken with increasing dispersion from 835 A per mm to 0.7 A per mm

SERIES E. LABORATORY SPECTRA

E 1 Photographs of spectrum of titanium: *a, b,* and *c,* given by carbon resistance furnace, temperatures approximately 2000°, 2400° and 2600° C., respectively; *d,* given by the arc (lines in furnace not given by arc for the most part due to impurities)

2 Photographs of spectrum of iron and vanadium: *a,* without magnetic field; *b,* with magnetic field, light vibrations perpendicular to lines of force; *c,* with magnetic field, light vibrations parallel to lines of force

3 Three sets of triplets in the spark spectrum of iron

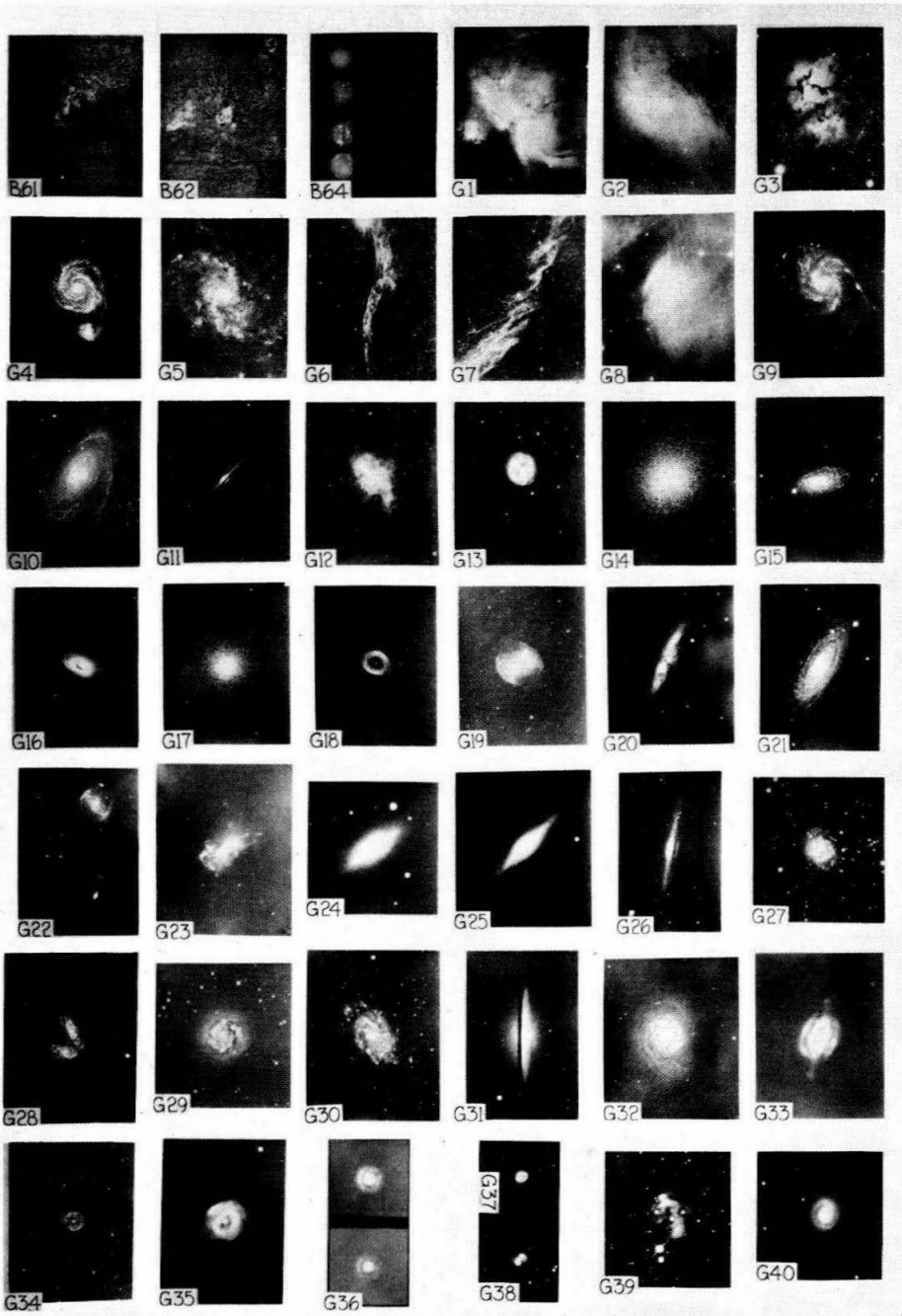
4 Zeeman effect for chromium (31,700 gausses) λ 4613 to λ 4626

5 Stark effect for chromium and hydrogen line Hγ. Three groups. Regions λλ 4098-4111-4129, λλ 5006-5028-5056, λλ 5275-5297-5329

SERIES G. NEBULAE AND STAR CLUSTERS

PHOTOGRAPHS TAKEN WITH THE 60-INCH REFLECTOR

G	1	M 42	N.G.C. 1976	*Orion,* Great Nebula (central portion), exposure 45 min., September 16, 1909
	*2	31	224	*Andromeda,* Great Nebula (central portion), exposure 2 hrs., October 13, 1909
	*3	20	6514	*Sagittarius,* Trifid Nebula, exposure 2 hrs. 26 min., June 4 and 5, 1910
	*4	51	5194	*Canes Venatici,* Spiral Nebula, exposure 10 hrs. 45 min., April 7 and 8, 1910
	*5	33	598	*Triangulum,* Spiral Nebula, exposure 8 hrs. 30 min., August 5, 6, 7, 1910
	6		6960	*Cygnus,* Slender Network Nebula (north part), exposure 6 hrs. 30 min., July 4 and 5, 1910
	7		6992	*Cygnus,* Larger Network Nebula, exposure 10 hrs. 15 min., July 2, 3, 4, 1910
	*8		1432	*Pleiades,* Diffuse Nebula around *Merope,* exposure 5 hrs., October 9, 1909
	*9	101	5457	*Ursa Major,* Spiral Nebula, exposure 7 hrs. 30 min., March 10 and 11, 1910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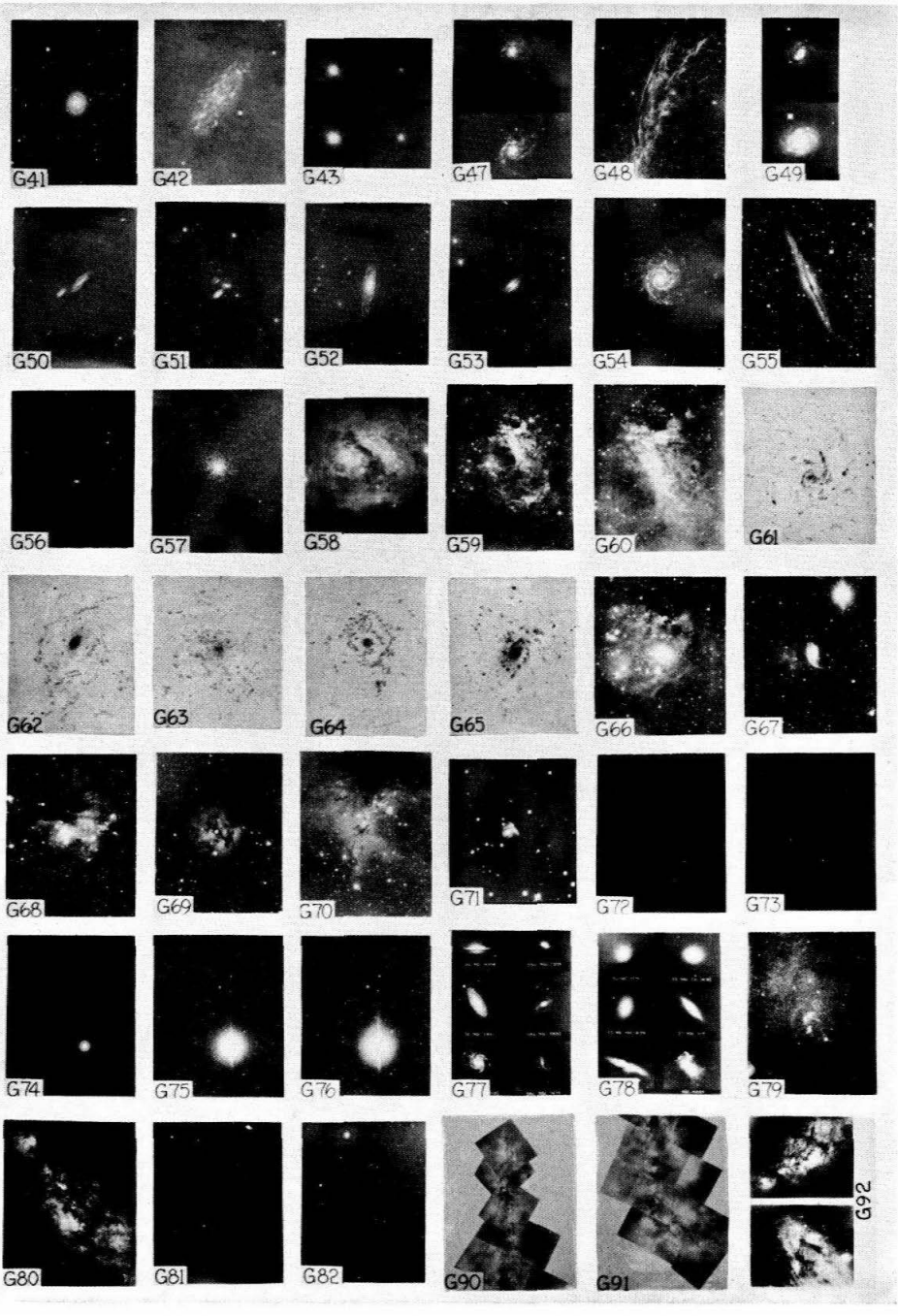
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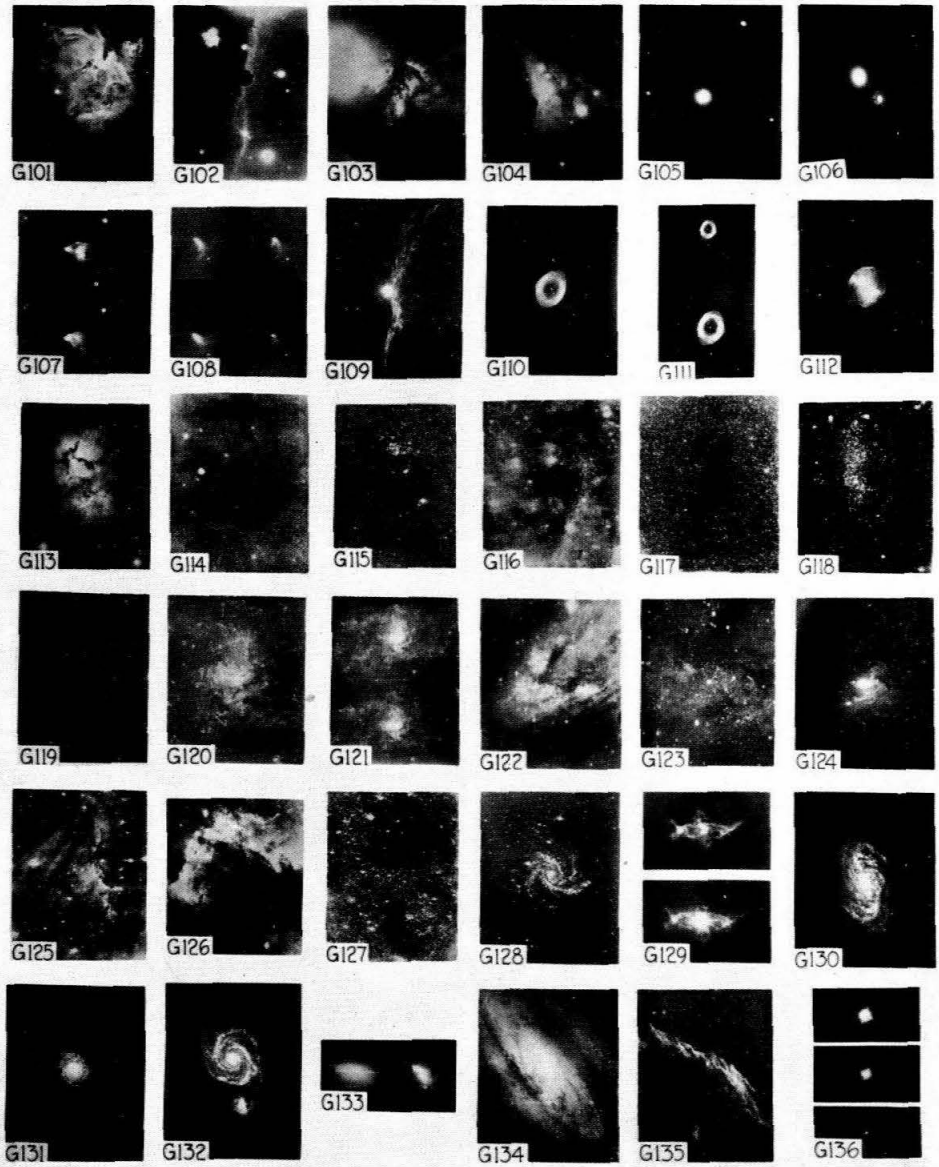
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G	*10	M 81	N.G.C. 3031	*Ursa Major,* Spiral Nebula, exposure 4 hrs. 15 min., February 5, 1910
	*11		4565	*Coma Berenices,* Spiral Nebula on edge, H V 24, exposure 5 hrs., March 6 and 7, 1910
	*12	1	1952	*Taurus,* Crab Nebula, exposure 3 hrs., October 13, 1909
	*13	97	3587	*Ursa Major,* Owl Nebula, exposure 4 hrs., February 9, 1910
	*14	13	6205	*Hercules,* Star Cluster, exposure 11 hrs., June 6, 7, 8, 1910
	15	63	5055	*Canes Venatici,* Spiral Nebula, exposure 5 hrs., March 9, 1910
	16	64	4826	*Coma Berenices,* Spiral Nebula, exposure 7 hrs. 56 min., May 5, 6, 7, 8, 1910
	17	3	5272	*Canes Venatici,* star Cluster, exposure 4 hrs., April 9, 1910
	*18	57	6720	*Lyra,* Ring Nebula, exposure 45 min., July 1, 1910
	19	27	6853	*Vulpecula,* Dumb-bell Nebula, exposure 5 hrs., July 6 and 7, 1910
	20	82	3034	*Ursa Major,* Irregular Nebula, exposure 4½ hrs., February 6, 1910
	*21		2841	*Ursa Major,* Spiral Nebula, exposure 2 hrs., February 19, 1912
	22		5383	*Canes Venatici,* Spiral Nebula, exposure 6 hrs., May 5 and 6, 1913
	23		4449	*Canes Venatici,* Irregular Nebula, exposure 5 hrs., April 7, 1913
	24	102	5866	*Boötes,* Split Spindle Nebula, exposure 2¾ hrs., June 14, 1912
	25		3115	*Sextans,* Spindle Nebula, exposure 1⅔ hrs., December 25, 1911
	26		5746	*Virgo,* Spiral Nebula on edge, exposure 6 hrs., March 20, 21, 22, 1914
	27		6555	*Hercules,* Spiral Nebula, exposure 6 hrs., May 28 and 29, 1916
	28		4567-8	*Virgo,* Twin Spiral Nebula, exposure 6 hrs., March 22, May 19, 1914
	29		278	*Cassiopeia,* Spiral Nebula, exposure 4 hrs., November 8, 1912

G	30		N.G.C. 2403	*Camelopardus,* Spiral Nebula, exposure 3½ hrs., November 8, 1912
	31		4594	*Virgo,* Spiral Nebula on edge, exposure 2¼ hrs., May 3, 1916
	32	M 94	4736	*Canes Venatici,* Spiral Nebula, exposure 3½ hrs., February 20, 1912
	33		7009	*Aquarius,* Planetary Nebula, exposure 3½ hrs., July 13, 1912
	34		1501	*Camelopardus,* Planetary Nebula, exposure 2 hrs., January 7, 1913
	35		7662	*Andromeda,* Planetary Nebula, exposure 1½ hrs., October 17, 1911
	36		2392	*Gemini,* Planetary Nebula, exposure 2 hrs., December 19, 1915
	37		2022	*Orion,* Planetary Nebula, exposure 1 hr., February 4, 1913
	38		2371-2	*Gemini,* Planetary Nebula, exposure 3¾ hrs., March 6, 7, 1916
	39		7008	*Cepheus,* Planetary Nebula, exposure 3 hrs., July 22, 1914
	40		2681	*Ursa Major,* Planetary Nebula, exposure 3½ hrs., January 7, 1913
	41		7217	*Pegasus,* Annular Nebula, exposure 5½ hrs., September 2, 1913
	42		2976	*Ursa Major,* Elliptical Nebula, exposure 3 hrs., December 10, 1912
	*43	13	6205	*Hercules,* Star Cluster, four exposures, 6, 15, 37½ and 94 minutes, increasing one magnitude on each exposure
	44		3242	*Hydra,* Planetary Nebula, comparison of yellow and blue images
	45	51	5194	*Canes Venatici,* Spiral Nebula, comparison of yellow and blue images
	46	94	4736	*Canes Venatici,* comparison of yellow and blue images
	47	99	4254	*Virgo,* Spiral Nebula, comparison of yellow and blue images
	48		6960	*Cygnus,* Network Nebula (south part), exposure 12 hrs., July 12, 13, 14, 1915

G	49	M 77	N.G.C. 1068	*Cetus,* Spiral Nebula, two exposures, December 22 and 25, 1911
	50		5857-8	*Boötes,* Double Spiral Nebula, H II 751-752, exposure 6 hrs., May 30, 31, June 1, 1916
	51		7317-20	*Pegasus,* Close Group of Spiral Nebulae, exposure 7 hrs. 45 min., August 26, 27, 1916
	52		7331	*Pegasus,* H I 53, Spiral Nebula, exposure 6 hrs. 15 min., August 28, 1916
	53		7814	*Pegasus,* H II 240, Spiral Nebula on edge, exposure 4 hrs., September 27, 1916
	54	74	628	*Pisces,* Spiral Nebula, exposure 5 hrs., October 26, 1916
	*55		891	*Andromeda,* H V 19, Spiral Nebula on edge, exposure 7 hrs. 15 min., November 23, 24, 1916
	56		7782	*Pisces,* Field of small Spiral Nebulae, exposure 4 hrs. 14 min., September 17, 1917
	57	22	6656	*Sagittarius,* Globular Cluster, exposure 3½ hrs., August 6, 1918
	58	8	6523	*Sagittarius,* Irregular Nebula, exposure 3 hrs., June 27, 1919
	59	17	6618	*Sagittarius* (Omega), Irregular Nebula, exposure 3 hrs., July 29, 1919
	60	17	6618	*Sagittarius* (Omega), Irregular Nebula, central or bright portion, exposure 3 hrs., July 29, 1919
	61	101	5457	*Ursa Major,* Spiral Nebula; same as G9, with arrows indicating internal motion in 1000 years
	62	81	3031	*Ursa Major,* Spiral Nebula; same as G10, with arrows indicating internal motion in 1300 years
	63	33	598	*Triangulum,* Spiral Nebula; same as G5, with arrows indicating internal motion in 2500 years
	64	51	5194	*Canes Venatici,* Spiral Nebula; same as G4, with arrows indicating internal motion in 1100 years
	65		2403	*Camelopardus,* Spiral Nebula; same as G30 with arrows indicating internal motion in 1300 years
	66		2175	*Orion,* Irregular Nebula, exposure 4 hrs. 10 min., January 7, 1921
	67		7635	*Cassiopeia,* Irregular Nebula, exposure 3 hrs., October 15, 1920

G *68		N.G.C. 281	*Cassiopeia,* Irregular Nebula with meteor trail, exposure 3 hrs. 30 min., August 11, 1921
69		I.C. 5146	*Cygnus,* Irregular Nebula, exposure 5 hrs.
70	M 16	N.G.C. 6611	*Scutum Sobieski,* Irregular Nebula, exposure 3 hrs. 25 min., August 25, 26, 1919
71			*Perseus,* Planetary Nebula about *Nova Persei,* exposure 5 hrs. 30 min., November 15, 1917
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79			*Orion,* Constellation of *Orion* and surrounding region, exposure 10 hrs., December 21, 22, 1919
80			*Sagittarius,* Star clouds in the Milky Way, exposure 3 hrs. 45 min., July 21, 1922

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	103		N.G.C. 2024	*Orion,* Nebula following *Zeta Orionis,* exposure 5 hrs. 35 min., December 8, 1920
	104		1977	*Orion,* Nebula north of the Great Nebula, exposure 5 hrs. 40 min., January 7, 1921
	105	M 87	4486	*Virgo,* Globular Nebula, exposure 2 hrs., February 26, 1920
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	108		6729	*Corona Australis,* Variable Nebula, four exposures, June 10, 1920; August 15, 1920; October 11, 1920; and August 8, 1921
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	114			*Ophiuchus,* Dark Nebula (S-shaped), Barnard 72, July 4, 1921
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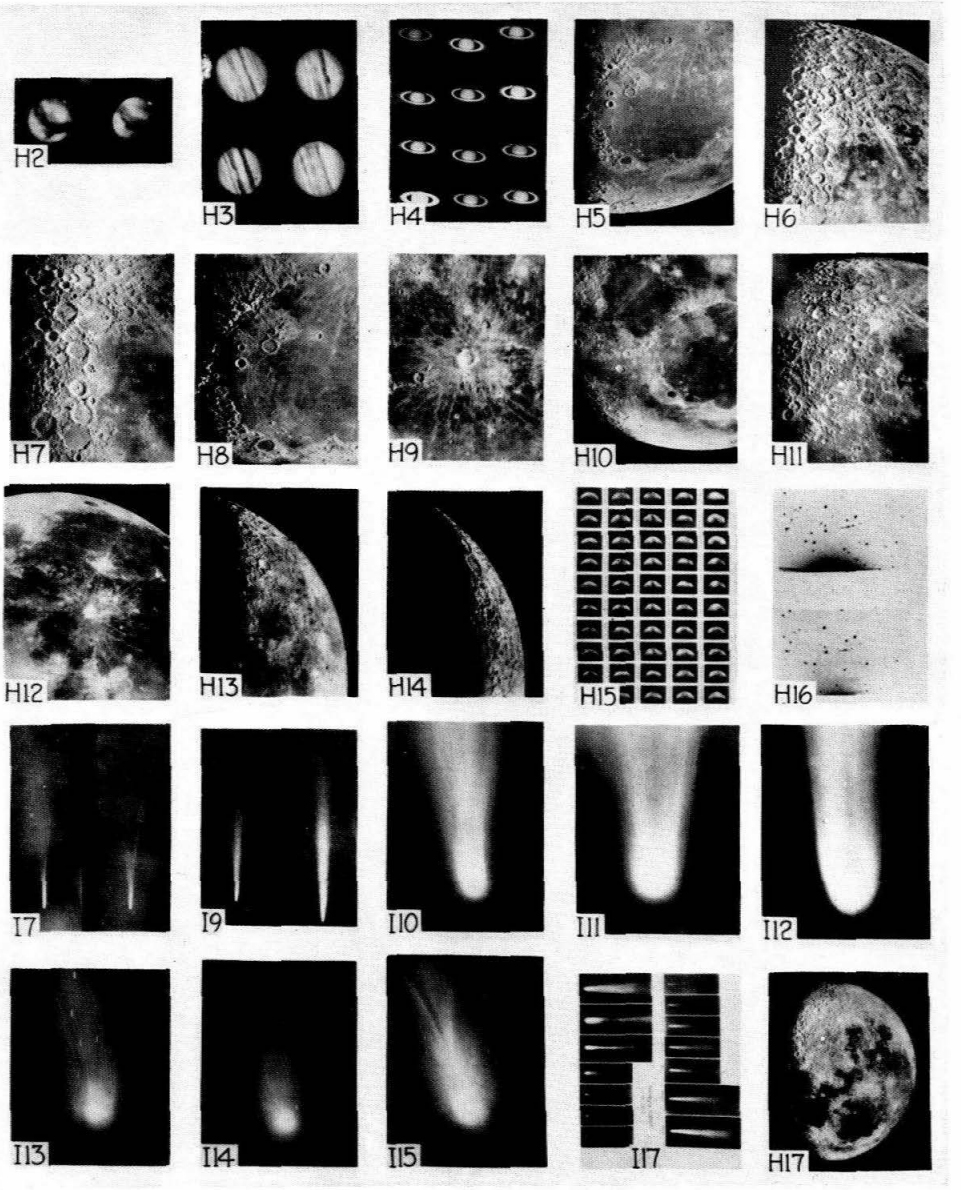
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